

# HEWLETT-PACKARD

## HP-71/HP Touchscreen and HP-71/HP 2392A Terminal Development Station

### HP-71 "KEYBOARD IS"

This demo is an example of how the HP Touchscreen computer and HP 2392A Display Terminal can be used as terminals in HP-71 program development. Differences between the Touchscreen and HP 2392A are minor, and are clearly marked.

This program, plus an HP-71/HP 3421A System Demo and a Modem Demo, is available through the Users' Library at a cost of \$15.00. It comes with 3½" disc, cassette tape, or magnetic card. Specify media type when you order part number 71-03421 from:

Hewlett-Packard  
Users' Library, Dept. 39UL  
1000 N.E. Circle Blvd.  
Corvallis, OR  
97330

### Required Equipment

- HP-71B Handheld Computer
- HP 82401A HP-IL Interface
- HP 82441A FORTH/Assembler ROM or 00071-90097 Software Developers' Handbook.\*
- HP Touchscreen Computer (or HP 2392A Display Terminal)
- HP 82164A HP-IL/RS-232C Interface
- HP 82059D AC Adapter/Recharger
- Two HP-IL cables
- One serial cable, female to male connection (standard 25 pin configuration)

### Hardware Configuration

#### HP-IL/RS-232C Interface

Configure the HP-IL/RS-232C interface as a DCE terminal (refer to pages 22 and 23 of the HP-IL/RS-232C interface owner's manual for specific instructions).

The HP-71B program will set up the control registers in the interface to ensure the proper hardware handshaking between the HP-71B and Touchscreen Computer (or HP 2392A).

### Instructions

- Connect the female end of the cable to the HP-IL/RS-232C interface. Connect the male end to the back of the Touchscreen Computer (or HP 2392A) in Port 1. Plug in the Touchscreen (or HP 2392A) power cord.
- Connect the AC Adapter/Recharger to the HP-IL/RS-232C interface. This recharger is the power supply for the interface.
- First turn on the Touchscreen (or HP 2392A), and then the HP-71B. The HP-71B will perform the auto addressing.
- If PAM comes up on the Touchscreen display, press **f6** Terminal to go into terminal mode. (Does not apply to HP 2392A.)
- On the Touchscreen (or HP 2392A), press **USER SYSTEM** to display the menu of the USER function keys and labels. (The function keys and labels on the display correspond with the **f1** to **f8** keys on the keyboard.) Function keys are as follows:

#### Touchscreen:

f1 Device Control	f5 Enhance Video
f2 Margins/Tabs/ Col	f6 Define Fields
f3 Service Keys	f7 Set Time
f4 Modes	f8 Config Keys

#### HP 2392A:

f1 Device Control	f5 (Blank)
f2 Margins/Tabs/ Col	f6 (Blank)
f3 Service Keys	f7 (Blank)
f4 Modes	f8 Config Keys

- To configure the Touchscreen (or HP 2392A) to the appropriate terminal and hardware configuration, press **f8** for "Config Keys." The Config Keys menu that appears in the display is:

#### Touchscreen:

f1 Global Config	f5 Terminal Config
f2 (Blank)	f6 Accessory Config
f3 Port1 Config	f7 (Blank)
f4 Port2 Config	f8 (Blank)

#### HP 2392A:

f1 (Blank)	f5 Terminal Config
f2 (Blank)	f6 (Blank)
f3 DataComm Config	f7 (Blank)
	f8 (Blank)
f4 Ext Dev Config	

- Press **f5** "Terminal Config". The existing terminal configuration will display menu keys which will enable you to change the configuration. Pressing **f5** gives you:

#### Touchscreen:

f1 Save Config	f5 (Blank)
f2 Next Choice	f6 (Blank)
f3 Previous Choice	f7 Display Functns
f4 System Defaults	f8 Config Keys

#### HP 2392A:

f1 Save Config	f5 (Blank)
f2 Next Choice	f6 (Blank)
f3 Previous Choice	f7 Display Functns
f4 Default Values	f8 Config Keys

Use the cursor keys (**←**, **→**, **↑**, and **↓**) or **TAB** to move to the appropriate field. Then press **f2** for "Next Choice" to change the field to the next selection. Change the appropriate fields according to the terminal configuration below. When you are finished, press **f1** "Save Config" to save the current terminal configuration. Whenever a configuration has been changed, be sure to save it before exiting the menu. When "Save Config" is pressed, the main system will reappear on the display.

\*Order from the Users' Library; 1000 N.E. Circle Blvd.; Corvallis, OR 97330.

## Terminal Configuration: Touchscreen

Bell	<b>On</b>	Cursor type	<b>Line</b>	Tab=Spaces	<b>No</b>		
Return Def	<b>cr</b>	Return=Enter	<b>No</b>	PrinterCode4	<b>Ext</b>	PrinterNulls	<b>0</b>
Local Echo	<b>Off</b>	Caps Lock	<b>Off</b>	Start Column	<b>1</b>	ASCII 8 Bits	<b>Yes</b>
XmitFnctr(A)	<b>Yes</b>	SPOW(B)	<b>No</b>	InhEoWrp(C)	<b>No</b>	Line/Page(D)	<b>Line</b>
InhHndShk(G)	<b>No</b>	InhDc2(H)	<b>No</b>	Auto Term(J)	<b>No</b>	ClearTerm(K)	<b>No</b>
InhS1fTst(L)	<b>No</b>			Exc Xfer(N)	<b>No</b>	InhDcTest(W)	<b>No</b>
						GraphCompat	<b>Off</b>
Field Separator	<b>us</b>	Block Terminator	<b>rs</b>	Alternate Set	<b>Line(B)</b>		
Terminal Id	<b>150A</b>			Transmit	<b>All Fields</b>		

- Press **f8** "Config Keys" to get the Config Key (Datacomm on HP 2392A) menu. Press **f3** "Port1 Config" ("Datacomm Config" on HP 2392A) to display the current Port1 (Datacomm on HP 2392A) configuration, along with the menu. You will see:

### Touchscreen:

f1 Save Config	<b>f5</b> (Blank)
f2 Next Choice	<b>f6</b> Config Menus
f3 Previous Choice	<b>f7</b> Display Functns
f4 System Defaults	<b>f8</b> Config Keys

### HP 2392A:

f1 Save Config	<b>f5</b> (Blank)
f2 Next Choice	<b>f6</b> Config Menus
f3 Previous Choice	<b>f7</b> Display Functns
f4 Default Values	<b>f8</b> Config Keys

Again, use the cursor keys to the appropriate field of the Full Duplex Hardwired Port1 configuration. Press **f2** for "Next Choice" to change the field to the next selection. After the appropriate changes have been made, press **f1** "Save Config" to save the current configuration. The main **(USER SYSTEM)** menu will appear.

## Terminal Configuration: HP 2392A

### TERMINAL CONFIGURATION

Datacomm/ExtDev PORT1/PORT2	Keyboard	USASCII					
Terminal Id 2392A	Language	ENGLISH					
Local Echo	<b>OFF</b>	Caps Lock	<b>OFF</b>	Start Col	<b>01</b>	Bell	<b>ON</b>
Xmit Fnctr(A)	<b>YES</b>	SPOW(B)	<b>NO</b>	InhEo1Wrp(C)	<b>NO</b>	Line/Page(D)	<b>Line</b>
InhHndShk(G)	<b>NO</b>	Inh DC2(H)	<b>NO</b>	Esc Xfer(N)	<b>NO</b>		
Fld Separator	<b>us</b>	Blk Terminator	<b>rs</b>	Return Def	<b>cr</b>		

## Port 1 Configuration: Touchscreen

Baud Rate	<b>9600</b>	Parity	<b>None</b>	Data Bits	<b>8</b>	Clock	<b>INT</b>
Asterisk	<b>Off</b>			Stop Bits	<b>1</b>	EnqAck	<b>No</b>
TR(CD)	<b>Hi</b>	Check Parity	<b>No</b>	SR(CH)	<b>Lo</b>		
RecvPace	<b>None</b>	SRRXmit	<b>No</b>	RR(CF)Recv	<b>No</b>		
XmitPace	<b>None</b>	SRRInvert	<b>No</b>	CS(CB)Xmit	<b>No</b>	DM(CC)Xmit	<b>No</b>

- Next, place the Touchscreen (or HP 2392A) in Remote mode by pressing **f4** "Modes". The following menu will appear:

### Touchscreen and HP 2392A:

f1 Line Modify	<b>f5</b> Smooth Scroll
f2 Modify All	<b>f6</b> Memory Lock
f3 Block Mode	<b>f7</b> Display Functns
f4 Remote Mode	<b>f8</b> Auto LF

Press **f4** "Remote Mode" to obtain an "\*" in the lower right corner of the block. This will indicate that remote mode is on. This toggle mechanism can be changed by pressing the key. Only the "Remote Mode" should contain the "\*". If any other blocks contain an "\*", press those keys to delete it.

- After configuring the Touchscreen (or HP 2392A), run the KBD150 program on the HP-71B by typing the following (assuming the program has been entered into the HP-71B either by hand or by a mass storage device):

RUN KBD150 **(ENDLINE)**

This program configures both the HP-71 and the terminal.

## Datacom Configuration: HP 2392A

### DATACOMM CONFIGURATION

Baud Rate	<b>9600</b>	Parity/DataBits	<b>None/8</b>	EnqAck	<b>No</b>
Asterisk	<b>OFF</b>	Chk Parity	<b>NO</b>	SR(CH)	<b>LO</b>
				SR(CH) Xmit	<b>NO</b>
RecvPace	<b>None</b>				
XmitPace	<b>None</b>				

**Important:** Always press **f1** "Save Config" after corrections have been made to the current configuration.

Line #	Program Statement	Explanation	Note: When the ` symbol is encountered, replace it in the program with the same number of spaces as there are symbols. For example, ` ` ` would be replaced with three spaces.
10	IF POS(VER\$,"KBD:")=0 THEN BEEP 1450,.1 @ DISP "NEED KEYBOARD LEX FILE" @ END	Verify that proper LEX files are present	
20	RESET ESCAPE @ REAL A @ DIM E\$ @ E\$=CHR\$(27)		
30	A=DEVADDR("RS232")	Get address of HP-IL/RS-232C interface.	
40	'RS232WT': CLEAR :RS232 @ REMOTE @ OUTPUT :RS232 interface ;"R0;R1;SE0;SE3;" @ LOCAL	Configure the HP-IL/RS-232C interface	
50	IF SPOLL("RS232")#929 THEN 'RS232WT'	Reinitialize RS-232C if not correct.	
60	!	The following mapping first lists the Touchscreen key (2392A), then the HP-71 key.	
70	ESCAPE "Q",105	INS C to I/R (toggle on).	
80	ESCAPE "N",105	INS C (with wrap around) to I/R (toggle on).	
90	ESCAPE "R",105	INS C to I/R (toggle off).	
100	ESCAPE "i",103	Back space to BACK (back space).	
110	ESCAPE "D",47	< to < (left arrow to left arrow).	
120	ESCAPE "C",48	> to > (right arrow to right arrow).	
130	ESCAPE "A",50	^ to ^ (up arrow to up arrow).	
140	ESCAPE "B",51	~ to ~ (down arrow to down arrow).	
150	ESCAPE "p",43	f1 (Attn) to ATTN.	
160	ESCAPE "q",89	f2 (FETCH) to FETCH.	
170	ESCAPE "r",150	f3 (Command Stack) to CMDS.	
180	ESCAPE "s",109	f4 (User) to USER (toggle user mode on and off).	
190	ESCAPE "t",162	f5 (Top) to blue up-arrow key (top of file).	
200	ESCAPE "u",159	f6 (Far Left) to blue left-arrow key (far left of line).	
210	ESCAPE "v",160	f7 (Far Right) to blue right-arrow key (far right of line).	
220	ESCAPE "w",163	f8 (Bottom) to blue down-arrow key (bottom of file).	
230	ESCAPE "h",102	~ (cursor home) to SST.	
240	ESCAPE "F",46	SHIFT ~ (cursor home down) to RUN.	
250	ESCAPE "J",107	Clear display to -LINE (clear to end of line).	
260	ESCAPE "K",107	Clear line to -LINE (clear to end of line).	

Line #	Program Statement	Explanation
270	OUTPUT :A ;E\$"&f1k0a16d2L	Assigns f1 on terminal. ~~Attn~~(ON)~~&E\$"&p";
280	OUTPUT :A ;E\$"&f2k0a16d2L	Assigns f2 on terminal. ~FETCH~~~~~&E\$"&q";
290	OUTPUT :A ;E\$"&f3k0a16d2L	Assigns f3 on terminal. Command~Stack~~&E\$"&r";
300	OUTPUT :A ;E\$"&f4k0a16d2L	Assigns f4 on terminal. User~~(toggle)"&E\$"&s";
310	OUTPUT :A ;E\$"&f5k0a16d2L	Assigns f5 on terminal. Top~~~~~&E\$"&t";
320	OUTPUT :A ;E\$"&f6k0a16d2L	Assigns f6 on terminal. ~~Far~~Left~~&E\$"&u";
330	OUTPUT :A ;E\$"&f7k0a16d2L	Assigns f7 on terminal. ~~Far~~Right~~&E\$"&v";
340	OUTPUT :A ;E\$"&f8k0a16d2L	Assigns f8 on terminal. Bottom~~~~~&E\$"&w";
350	OUTPUT :A ;E\$"&jB";	Display user keys (f1-f8) on terminal.
360	LC OFF	Allows upper and lower case letters.
370	SFLAG -21	Allows the terminal to wake up to the HP-71.
380	DISPLAY IS :RS232 @	
	KEYBOARD IS :RS232	
390	END	

The **USER SYSTEM** menu should now be replaced by the following menu with the appropriate HP-71 functions:

*Touchscreen and HP 2392A:*

f1 Attn (ON)	f5 Top
f2 FETCH	f6 Far Left
f3 Command Stack	f7 Far Right
f4 User (toggle)	f8 Bottom

The standard HP-71B cursor "," will appear in the top left side of the Touchscreen (HP 2392A) display. The Touchscreen (HP 2392A) keyboard can now be used to generate programs into the HP-71.

When you are finished with this demo, be sure to type the following on the HP-71:

Delay .5,.125 **[ENDLINE]**  
CFLAG(-21) **[ENDLINE]**  
Reset escape **[ENDLINE]**  
Keyboard is\* **[ENDLINE]**  
Display is Display **[ENDLINE]**

**Hewlett-Packard**  
**Handheld Products Operation**  
**1000 N.E. Circle Blvd.**  
**Corvallis, Oregon 97330**

For additional information, visit your nearest HP dealer. For the location and number of the dealer nearest you, call toll-free 1-800-FOR-HPPC (1-800-367-4772).